CLAIMS

1. An electric high voltage AC machine, intended to be directly connected to a distribution or transmission network (16), said machine including at least one winding comprising at least one insulated current-carrying conductor (4), **characterized in** that a first layer (6) having semi-conducting properties is provided around said conductor (4), a solid insulating layer (7) is provided around said first layer, and a second layer (8) having semi-conducting properties is provided around said insulating layer, and in that grounding means (18,21,22,24,26.28,30,32,34,35,36,37,38,39,40,42,44,46,48, 52) are provided to connect at least one point of said winding to ground.

2. The machine according to claim 1, ~~characterized in that~~ wherein the potential of said first layer is substantially equal to the potential of the conductor.

3. The machine according to claim 1 ~~or 2~~, **characterized in** that said second layer is arranged to constitute substantially an equipotential surface surrounding said conductor.

4. The machine according to claim 3, ~~characterized in that~~ wherein said second layer is connected to a predetermined potential.

5. The machine according to claim 4, ~~characterized in that~~ wherein said predetermined potential is ground potential.

6. The machine according to any one of the claims 1, 2, 3, 4 or 5, **characterized in** that at least two adjacent layers have substantially equal thermal expansion coefficients.

7. The machine according to any one of the preceding claims, **characterized in** that said current-carrying

conductor comprises a number of strands, only a minority of said strands being non-isolated from each other.

8. The machine according to any one of the preceding claims, **characterized in** that each of said three layers is fixed connected to adjacent layer along substantially the whole connecting surface.

9. An electric AC machine having a magnetic circuit for high voltage comprising a magnetic core and at least one winding, ~~characterized in that~~ wherein said winding is formed of a cable comprising one or more current-carrying conductors, each conductor having a number of strands, an inner semi-conducting layer provided around each conductor, an insulating layer of solid insulating material provided around said inner semi-conducting layer, and an outer semi-conducting layer provided around said insulating layer, and in that grounding means are provided to connect at least one point of said winding to ground.

10. The machine according to claim 9, ~~characterized in that~~ wherein said cable also comprises a metall shield and a sheath.

11. The machine according to any one of the preceding claims, **characterized in** that said grounding means comprise means for direct grounding of the winding.

12. The machine according to any one of the claims 1 through 10, **characterized in** that said grounding means comprise means for low-resistance grounding of the winding.

13. The machine according to claim 12, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said low-resistance grounding means comprise a low-resistance resistor connected between the neutral point and ground.

14. The machine according to claim 12, said machine having a Y-connected winding the neutral point of which

being available, **characterized in** that said low-resistance grounding means comprise a resistor connected in the secondary of a transformer whose primary is connected between the neutral point and ground.

15. The machine according to any one of the claims 1 through 10, **characterized in** that said grounding means comprise means for low-inductance grounding of the winding.

16. The machine according to claim 15, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said low-inductance grounding means comprise a low-inductance inductor connected between the neutral point and ground.

17. The machine according to claim 15, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said low-inductance grounding means comprise an inductor connected in the secondary of a transformer whose primary is connected between the neutral point and ground.

18. The machine according to any one of the claims 1 through 10, **characterized in** that said grounding means comprise means for high-resistance grounding of the winding.

19. The machine according to claim 18, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said high-resistance grounding means comprise a high-resistance resistor connected between the neutral point and ground.

20. The machine according to claim 18, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said high-resistance grounding means comprise a resistor connected in the secondary of a transformer whose primary is connected between the neutral point and ground.

21. The machine according to any one of the claims 1 through 10, **characterized in** that said grounding means comprise means for high-inductance grounding of the winding.

22. The machine according to claim 21, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said high-inductance grounding means comprise a high-inductance inductor connected between the neutral point and ground.

23. The machine according to claim 21, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said high-inductance grounding means comprise an inductor connected in the secondary of a transformer whose primary is connected between the neutral point and ground.

24. The machine according to any one of the claims 1 through 10, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said grounding means comprise a reactor connected in the secondary of a transformer whose primary is connected between the neutral point and ground, said reactor having characteristics such that the capacitive current during a ground fault is substantially neutralized by an equal component of inductive current contributed for by the reactor.

25. The machine according to any one of the claims 1 through 10, **characterized in** that said grounding means comprise means for changing the impedance of the connection to ground in response to a ground fault.

26. The machine according to any one of the claims 1 through 10, **characterized in** that said grounding means comprise an active circuit.

27. The machine according to any one of the claims 1 through 10, **characterized in** that said grounding means

comprise a Y-Δ grounding transformer connected to the network side of the machine.

28. The machine according to any one of the claims 1 through 10, **characterized in** that said grounding means comprise a so-called zigzag grounding transformer connected to the network side of the machine.

29. The machine according to any one of the claims 1 through 10, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said grounding means comprise a suppression filter tuned for the n:th harmonic.

30. The machine according to any one of the claims 1 through 10, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said grounding means comprise a switchable suppression filter detuned for the n:th harmonic.

31. The machine according to claim 29 or 30, **characterized in** that said n:th harmonic is the third harmonic.

32. The machine according to any one of the claims 1 through 10, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that said grounding means comprise an overvoltage protector connected between said neutral point and ground.

33. The machine according to any one of the claims 18 through 31, said machine having a Y-connected winding the neutral point of which being available, **characterized in** that an overvoltage protector is connected between said neutral point and ground in parallel to said grounding means.

34. A distribution or transmission network, **characterized in** that it comprises at least one machine according to any one of the claims 1 through 33.